October 28, 2025

Firms in Competitive Markets

Additional note II

Long-Run Decisions

Long-Run Decisions

Entry and Exit

- If existing firms have positive economic profits, new firms have an incentive to enter the industry.
- If existing firms have zero profits, there are no incentives for new firms to enter, and no incentives for existing firms to exit.
- If existing firms have economic losses, there is an incentive for existing firms to exit the industry.

The Firm's Long-Run Decision to Exit or Enter a Market

- **Exit** refers to a long-run decision to leave the market
- **The firm exits the market if the revenue it would get from producing is less than its total cost of production**

Exit if $TR < TC$

Exit if $TR < TC$

Exit if $TR/Q < TC/Q$

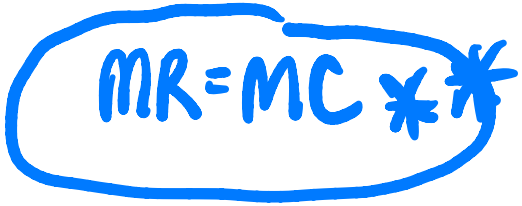
Exit if $P < ATC$

A firm exits if the price of the good is less than the average total cost of production

- A parallel analysis applies to entreprenuers who could establish new firms. They have an incentive to enter the market if doing so would be profitable, which occurs if the price exceeds average total cost.

- The entry rule is

Enter if P $>$ ATC



- We can now describe a competitive firm's long run profit maximizing strategy. If it produces anything, it chooses the quantity at which **marginal cost equals the price of the good**.

- Yet if the **price is less than the average total cost at that quantity**, the firm decides to **exit** (or not enter) the market

- **The competitive firm's long-run supply curve is the portion of its marginal cost curve that lies above the average total cost curve**

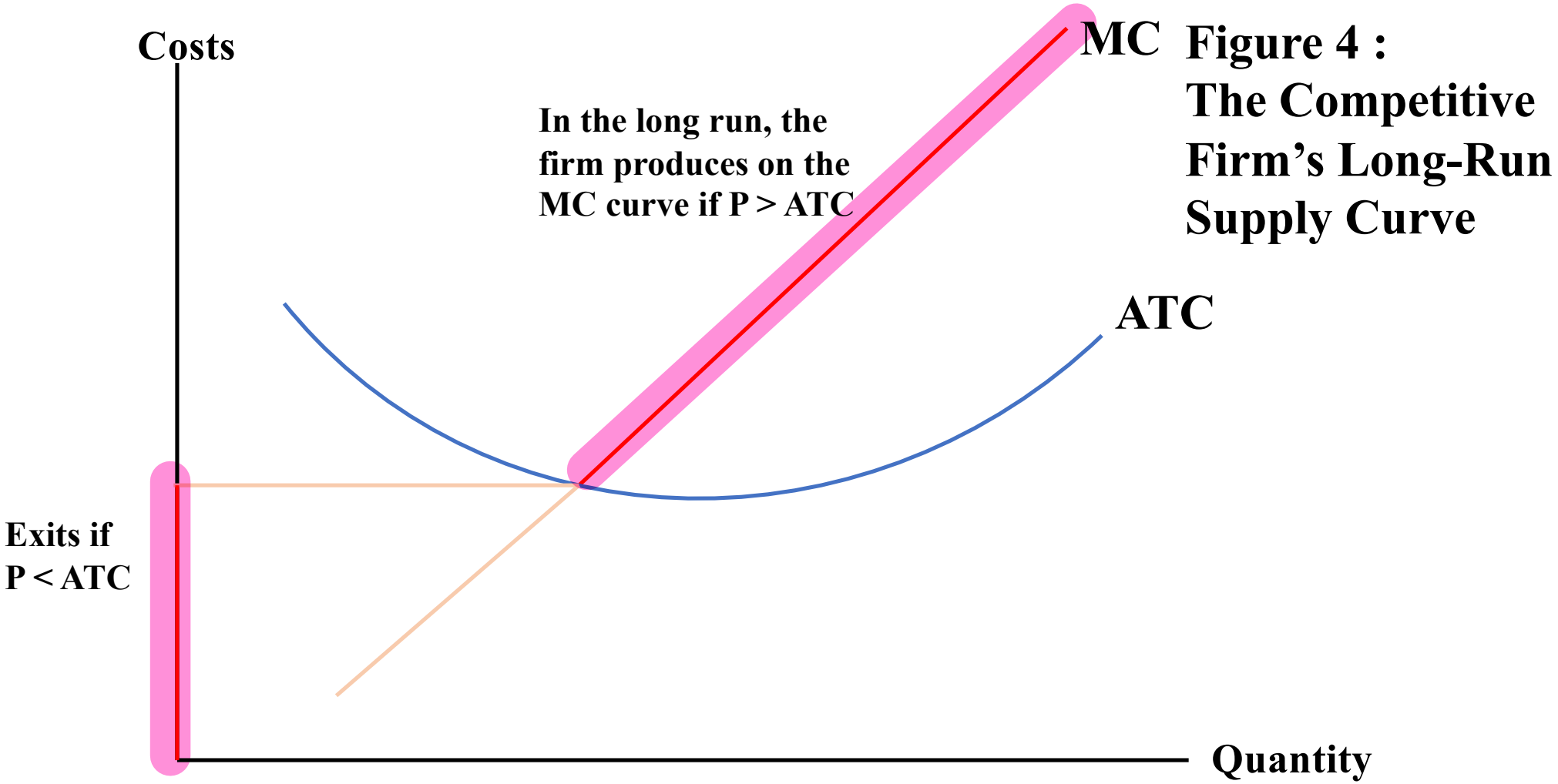


Figure 4 : The Competitive Firm's Long-Run Supply Curve

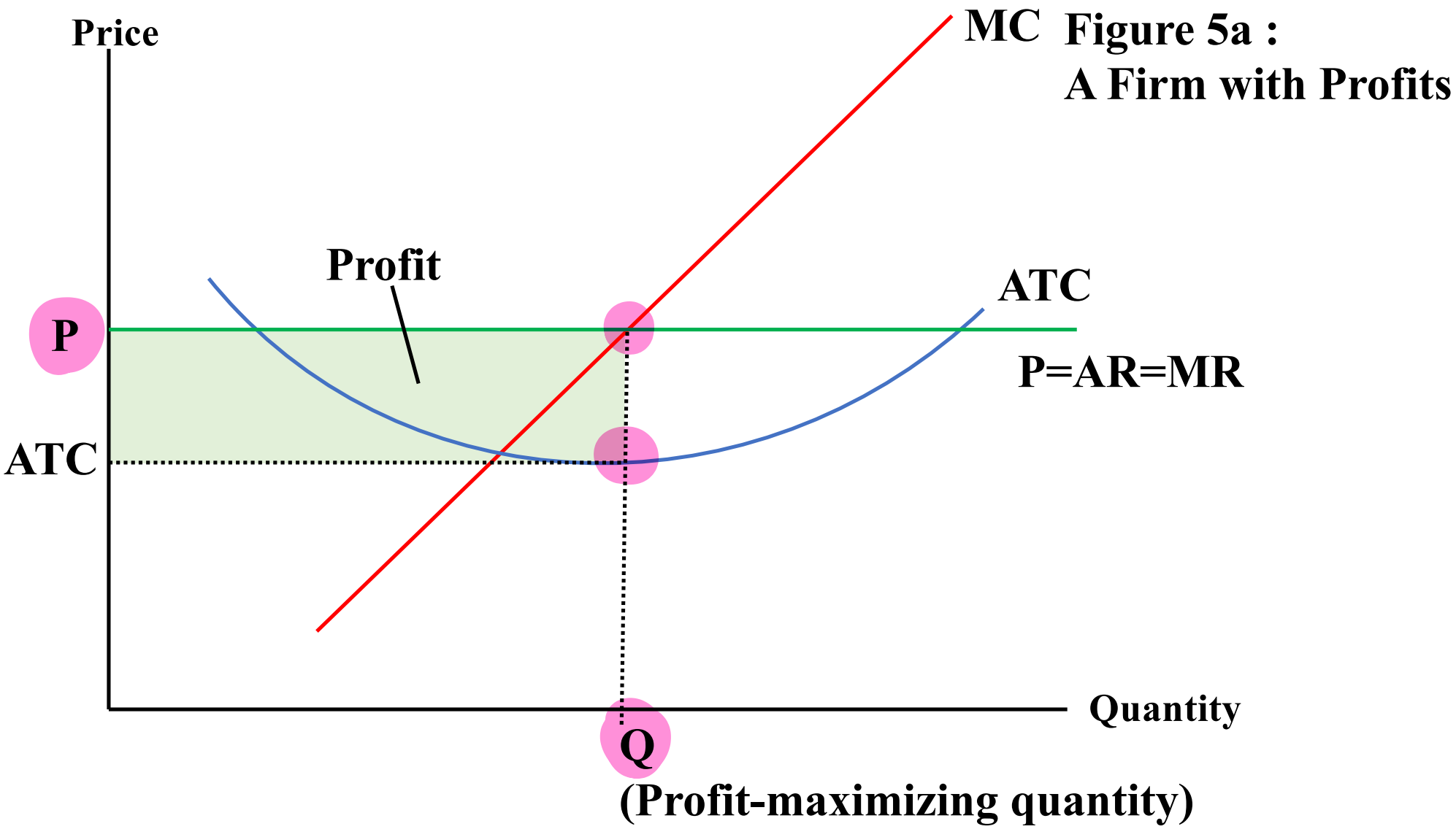
In the long run, the competitive firm's supply curve is the portion of its marginal cost curve (MC) that lies above its average-total cost curve (ATC). If the price falls below average total cost, the firm is better off exiting the market.

Measuring Profit in Our Graph for the Competitive Firm

$$\textbf{Profit} = \textbf{TR} - \textbf{TC}$$

$$\textbf{Profit} = (\textbf{TR}/\textbf{Q} - \textbf{TC}/\textbf{Q}) \times \textbf{Q}$$

$$\textbf{Profit} = (\textbf{P} - \boldsymbol{ATC}) \times \textbf{Q}$$


Price
MC
Figure 5a :
A Firm with Profits
Profit
ATC
P
P=AR=MR
ATC
Quantity
Q
(Profit-maximizing quantity)

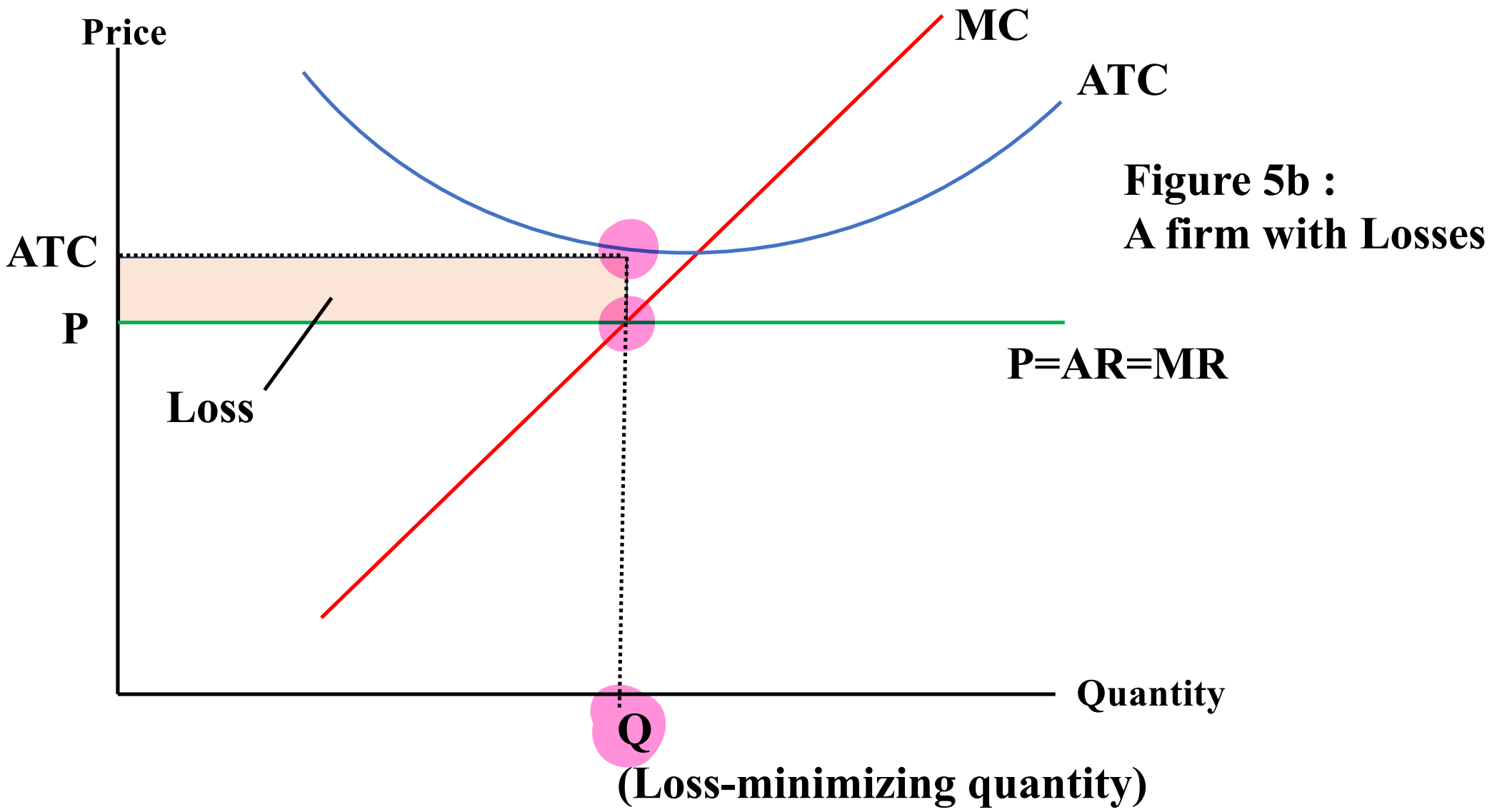


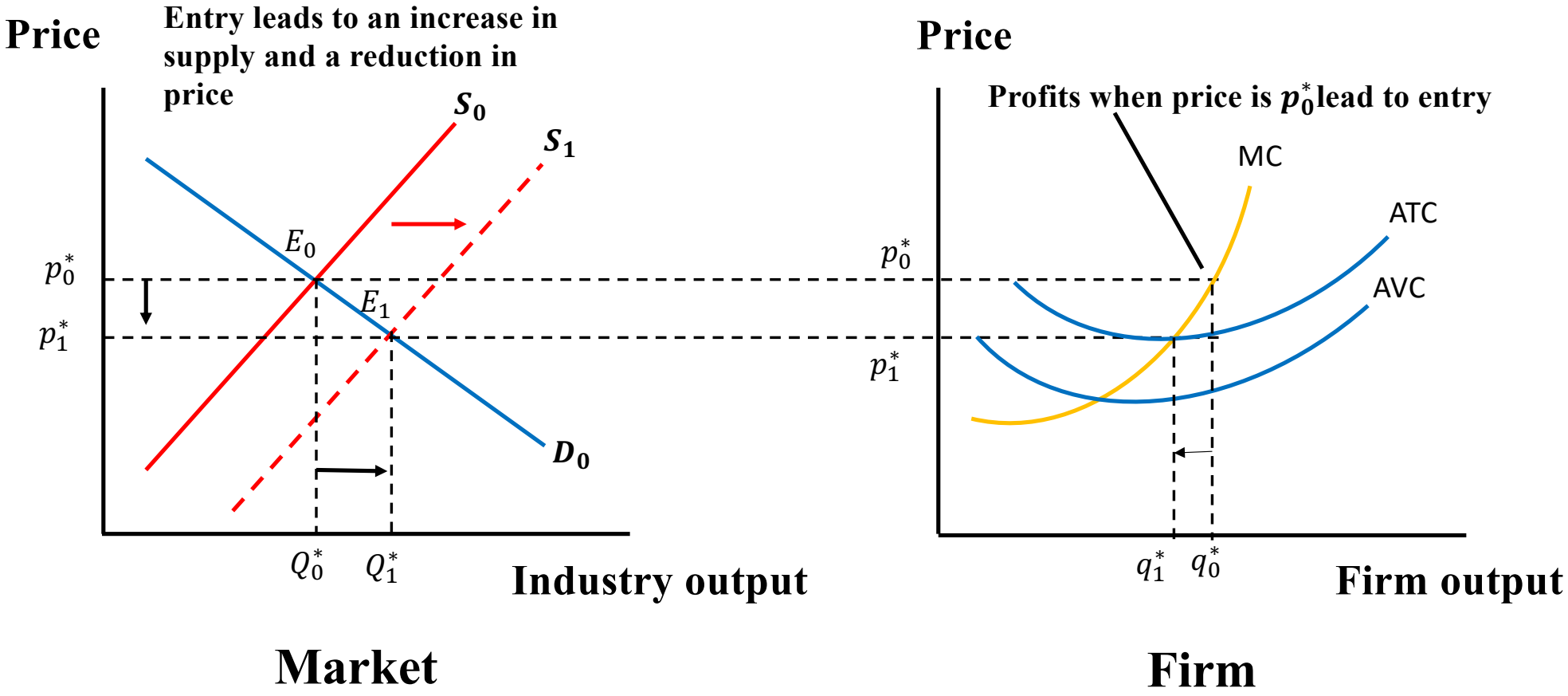
Figure 5b :
A firm with Losses

Adjustments in the Long Run

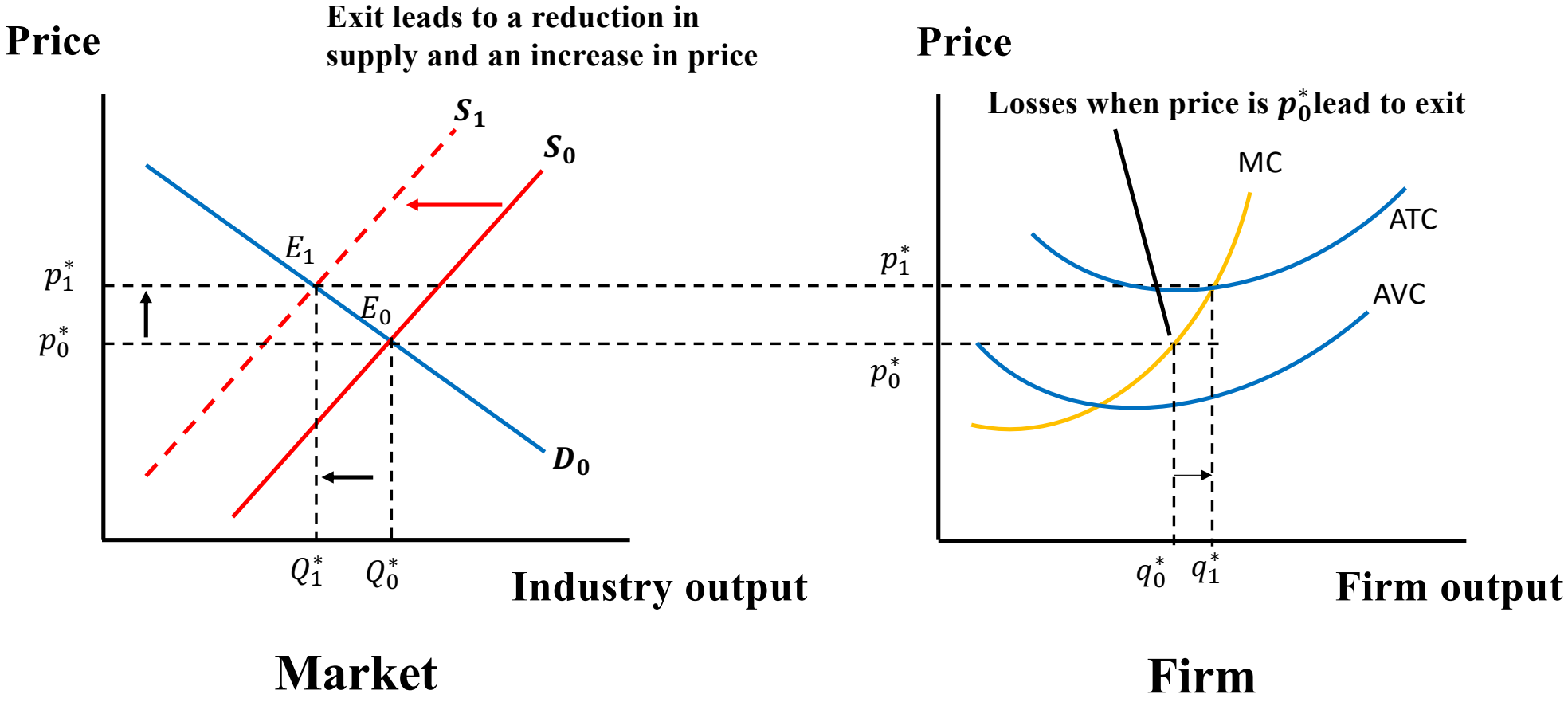
- Positive economic profit creates an incentive for outsiders to enter the industry
- As additional firms enter the industry the industry supply curve to the right
- This adjustment will continue until these two conditions are met:

1) Price reaches the minimum point on the LAC curve
2) All firms have moved to the capital stock size that gives rise to a short-run average total cost curve that is tangent to the LAC at its minimum point

The Effect of New Entrants Attracted by Positive Profits



The Effect of Exit Caused by Losses



Sunk Costs and the Speed of Exit

- The process of exit is not always quick and is sometimes painfully slow for the loss-making firms in the industry

- This depends on how quickly capital becomes obsolete or becomes too costly to operate

- The longer it takes for firm's capital to become obsolete or too costly to operate, the longer firms will remain in the industry while they are earning economic losses

Long-Run Equilibrium

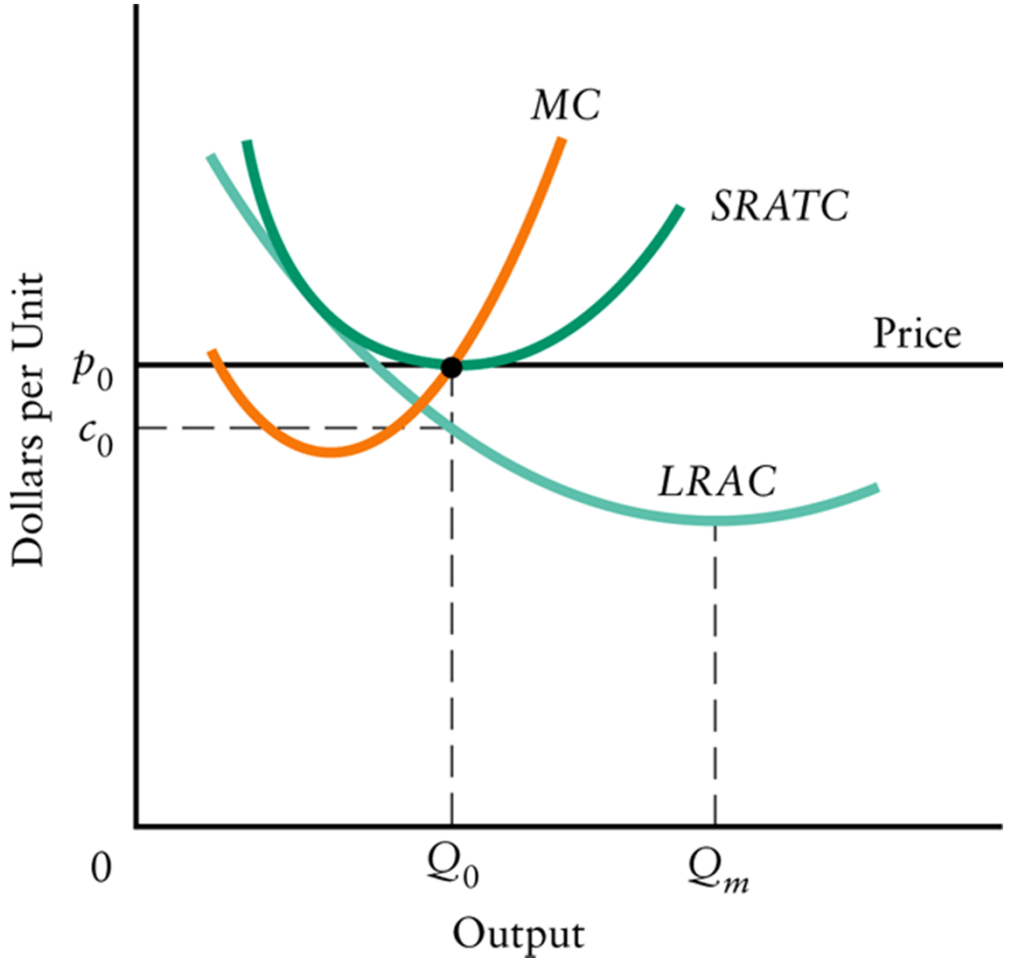
- The LR industry equilibrium occurs when there is no longer incentive for entry or exit (or expansion)

- The LR equilibrium of a competitive industry occurs when firms are earning zero profits

4 conditions for a competitive industry to be in long-run equilibrium

1. Existing firms must be maximizing their profits, given their existing capital
2. Existing firms must not be suffering losses
3. Existing firms must not be earning profits
4. Existing firms must not be able to increase their profits by changing the size of point of its LRAC curve

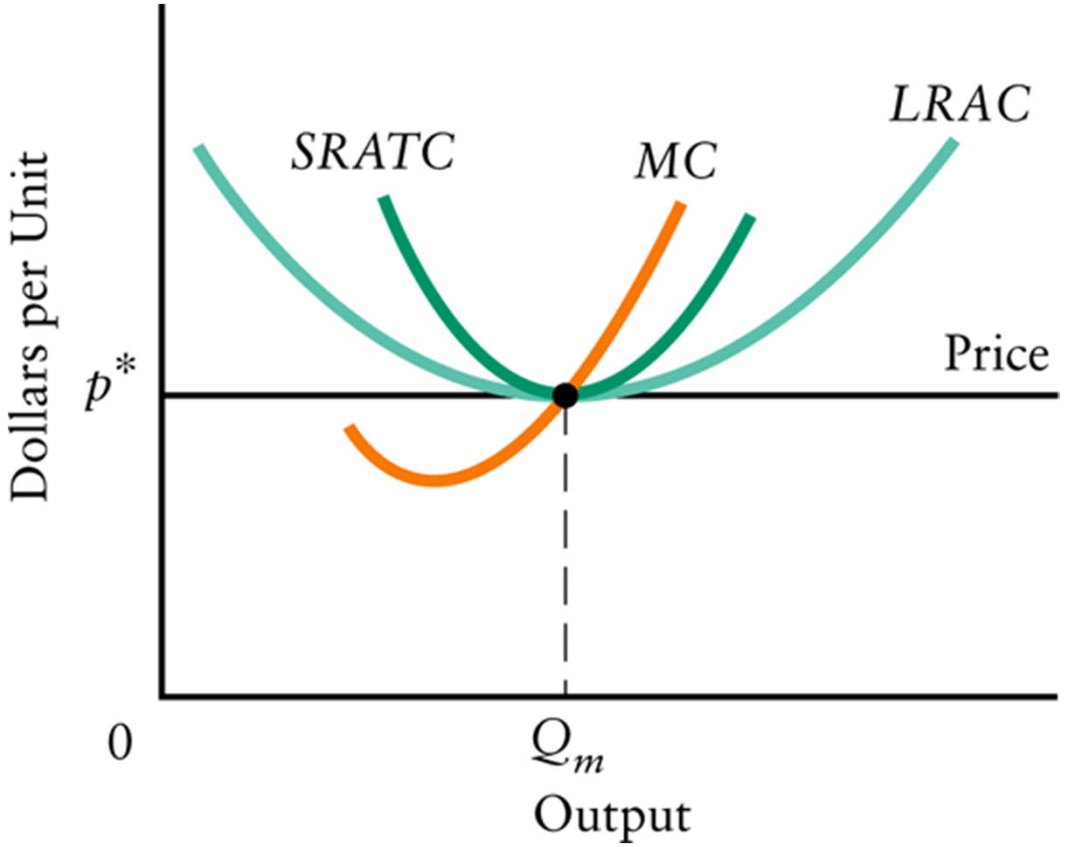
Short-Run versus Long-Run Profit Maximization for a Competitive Firm



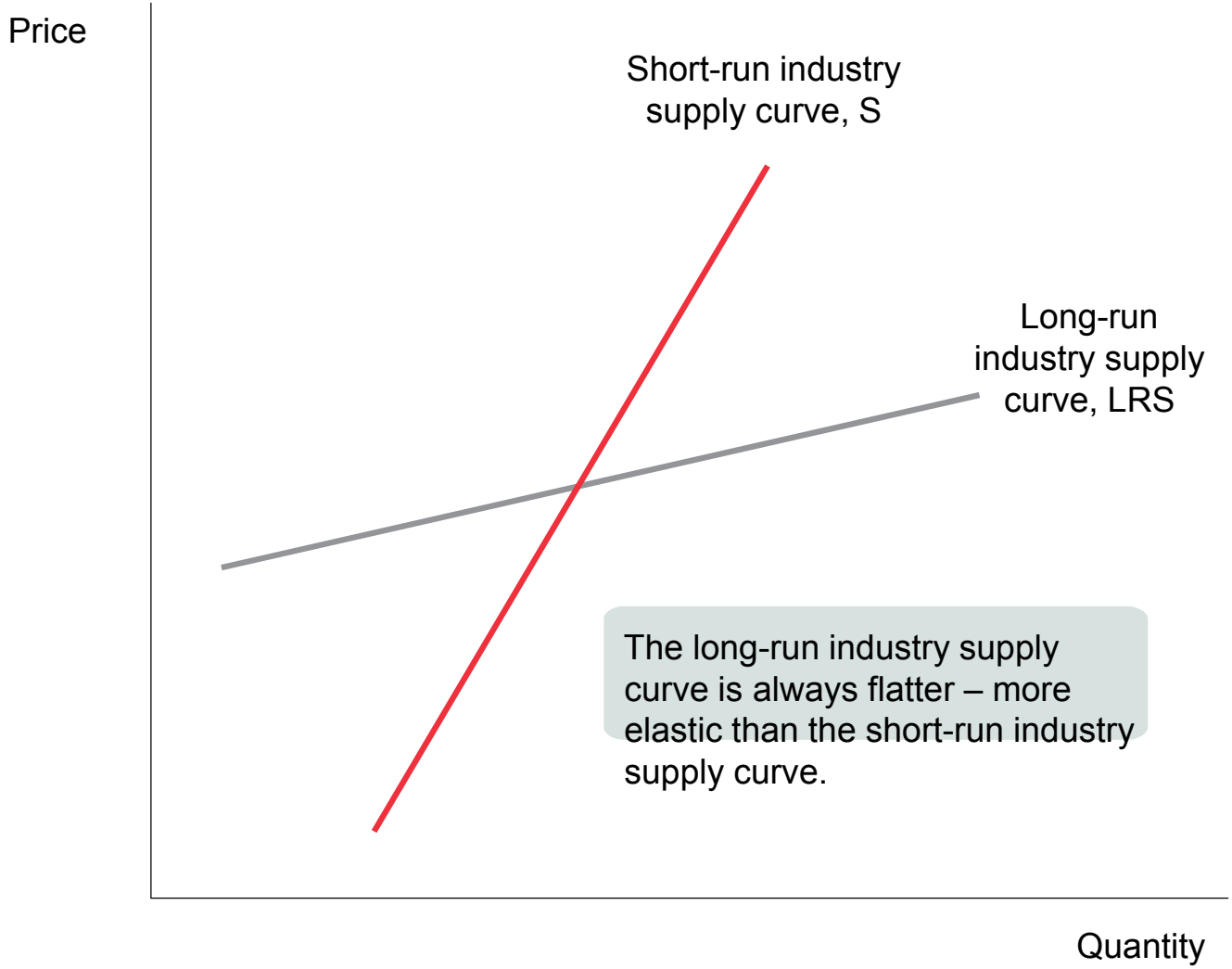
A Competitive firm that is not at the minimum point on its L RAC curve is not maximizing its long run profits

- A competitive firm with SRATC and MC faces a market price of P_0
- The firm produces Q_0, where MC equals price and TC are just being covered
- LRAC lies below its SRATC at output Q_0
- The firm could produce output Q_0 at cost $c_0$by building plant so as to take advantage of economies of scale
- Profits would rise because ATC of $c_0$would then be less than price p_0

A Typical Competitive Firm When the Industry Is in Long-Run Equilibrium



Comparing the Short-Run and Long-Run Industry Supply Curves



LRS may slope upward, but it is always flatter—***more elastic***—than the short-run industry supply curve.

This is because of ***entry and exit***:

- a higher price attracts new entrants in the long run, resulting in a rise in industry output and lower price;
- a fall in price induces existing producer to exit in the long run, generating a fall in industry output and a rise in price.

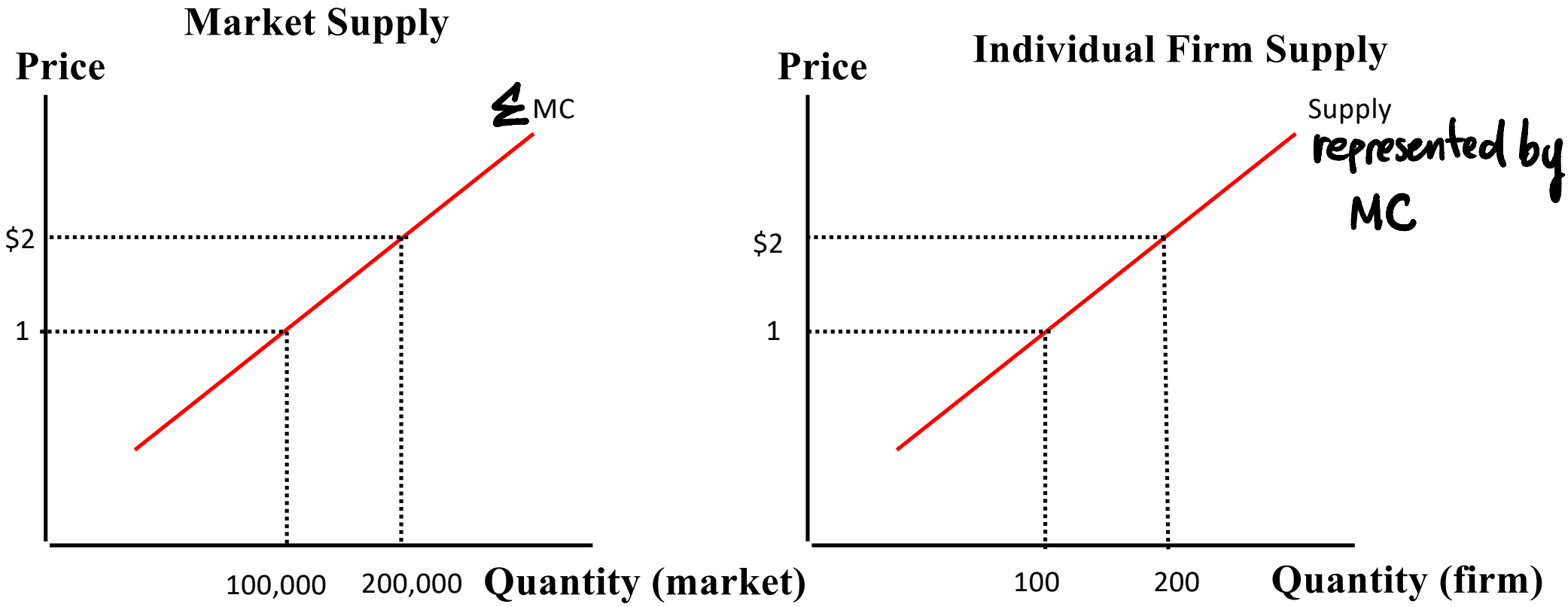
The Supply Curve in a Competitive Market

- The Short Run: Market Supply with a Fixed Number of Firms
- The Long Run : Market Supply with Entry and Exit

The Short Run: Market Supply with a Fixed Number of Firms

- Imagine a market with 1,000 identical firms.
- Each firm acts according to our standard model: For any price, it supplies the quantity of output at which its marginal cost equals the price.
- Panel (a) – As long as price exceeds AVC, each firm's MC curve is its supply curve.The quantity of output supplied to the market equals the sum of the quantities supplied by each of the 1,000 firms. The market supply curve is derived by horizontally adding the supply curves of all the firms.
- Panel (b) – the quantity supplied to the market is 1,000 times the quantity supplied by each of these identical firms.

The Short Run: Market Supply with a Fixed Number of Firms



The Long Run : Market Supply with Entry and Exit

- Now consider what happens when **firms can enter and exit the market**
- Let's suppose that everyone has access to the same production technology and access to the same markets to buy the inputs for production. As a result, all current and potential firms have the same cost curves.
- Decision about entry and exit in a market of this type depend on the incentives facing the owners of existing firms and the entrepreneurs who could start new firms.
  - If firms already in the market are **profitable**, new firms will enter. This entry will expand the number of firms, increase the quantity of the good supplied, and drive down prices and profits.
  - If firms in the market are making **losses**, some existing firms will exit. Their exit will reduce the number of firms, decrease the quantity of the good supplied, and drive up prices and profits.

- At the end of this process of entry and exit, firms that remain in the market must be making zero economic profit

$$Profit = (P - ATC) \times Q$$

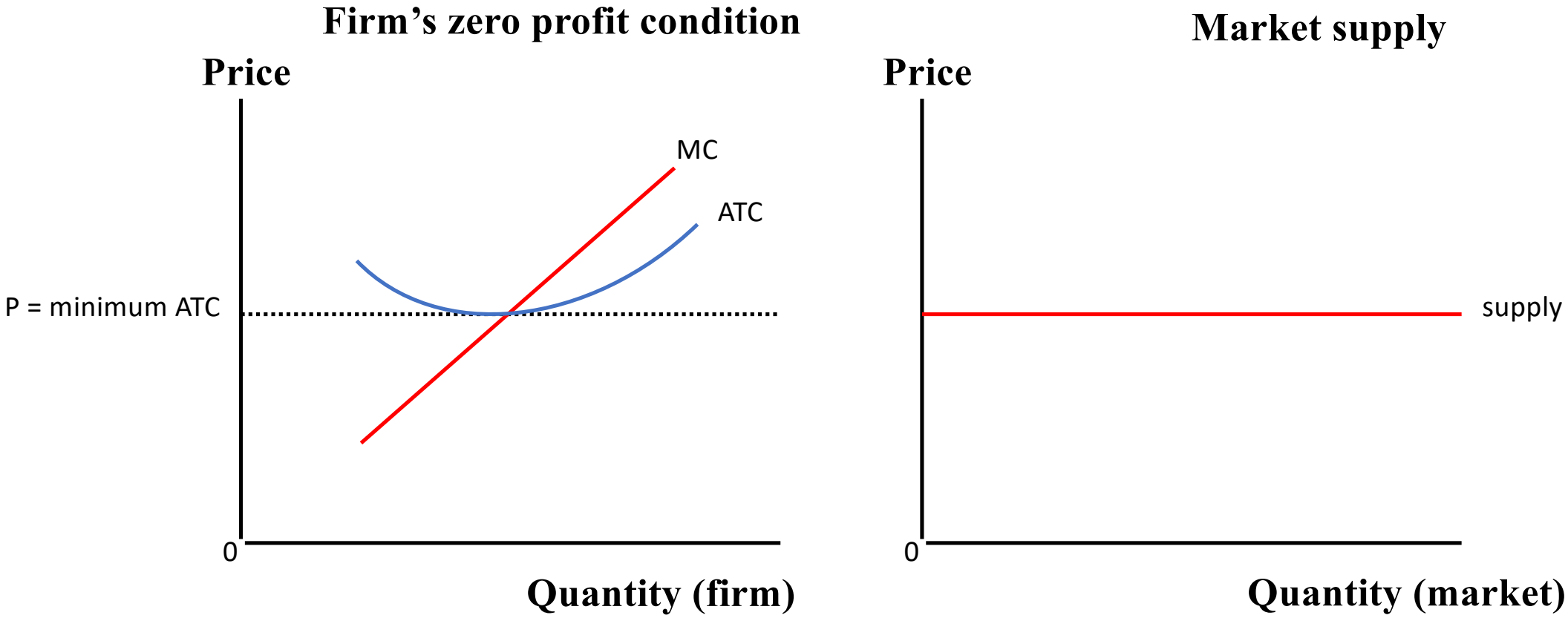
The process of entry and exit ends only when price and average total cost are driven to equality.

P=MR=AR=D

- Competitive firms maximize profits by choosing a quantity at which price equals MC.
- Free entry and exit force price to equal ATC
- If price is to equal both MC and ATC, these two measures of cost must equal each other. MC and ATC are equal only when the firm is operating at the minimum of ATC.
- Therefore , in the long-run equilibrium of a competitive market with free entry and exit, firms operate at their **efficient scale**.

New firms have no incentive to enter the mkt., and existing firms have no incentive to leave the mkt.

Long-Run Market Supply



From this analysis of firm behavior, we can determine the LR supply curve for the market.

- In a market with free entry and exit, there is only one price consistent with zero profit. - the minimum of average total cost.
- As a result, the LR market supply curve must be horizontal at this price.
- Any price above this level would generate profits, leading to entry and an increase in the total quantity supplied

- Any price below this level would generate losses, leading to exit and a decrease in the total quantity supplied.
- Eventually, the number of firms in the market adjusts so that price equals the minimum of average total cost, and there are enough firms to satisfy all the demand at this price.

P=MR=AR=D

Profit-Maximizing Rules for a Competitive Firm

1. Find Q at which P = MC
2. If P < AVC, shut down immediately and remain out of business
3. If AVC < P < ATC, operate in the short run but exit in the long run
4. If ATC < P, stay in business and enjoy your profits

Why do " competitive firms stay in business if they make zero profit?

The zero profit condition more fully, recall that profit equals total revenue minus total cost and that total cost includes all the opportunity costs of the firm.

In particular, total cost includes the time and money that the firm owners devote to the business. What is crucial is that in the zero-profit equilibrium, the firm's revenue must compensate the owners for these opportunity costs.

Consider an example, suppose that, to start a farm, a farmer had to invest $1 million, which otherwise could have earned $40,000 a year in interest in a bank account.

In addition, the farmer had to give up another job that would have paid $60,000 a year. Then the opportunity cost of farming includes both the forgone interest and the forgone wages-a total of $100,000.

Even if the farm's profit is driven to zero, its revenue compensates the farmer for these opportunity costs.

Recall that accountants and economists measure costs differently. As previous chapter noted, accountants keep track of explicit costs but not implicit ones. They measure costs that require an outflow of money but ignore the opportunity costs for which no money leaves the firm.

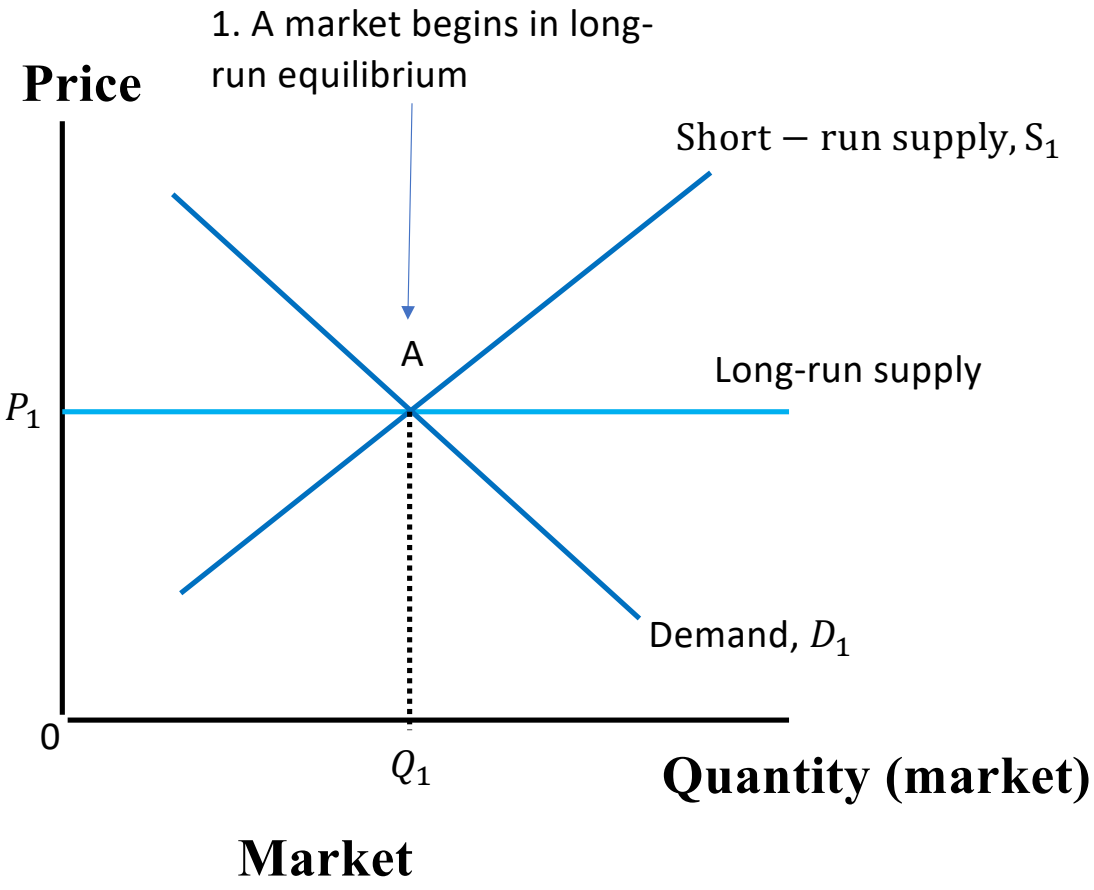
As the result, in the zero-profit equilibrium, economic profit is zero, but accounting profit is positive.

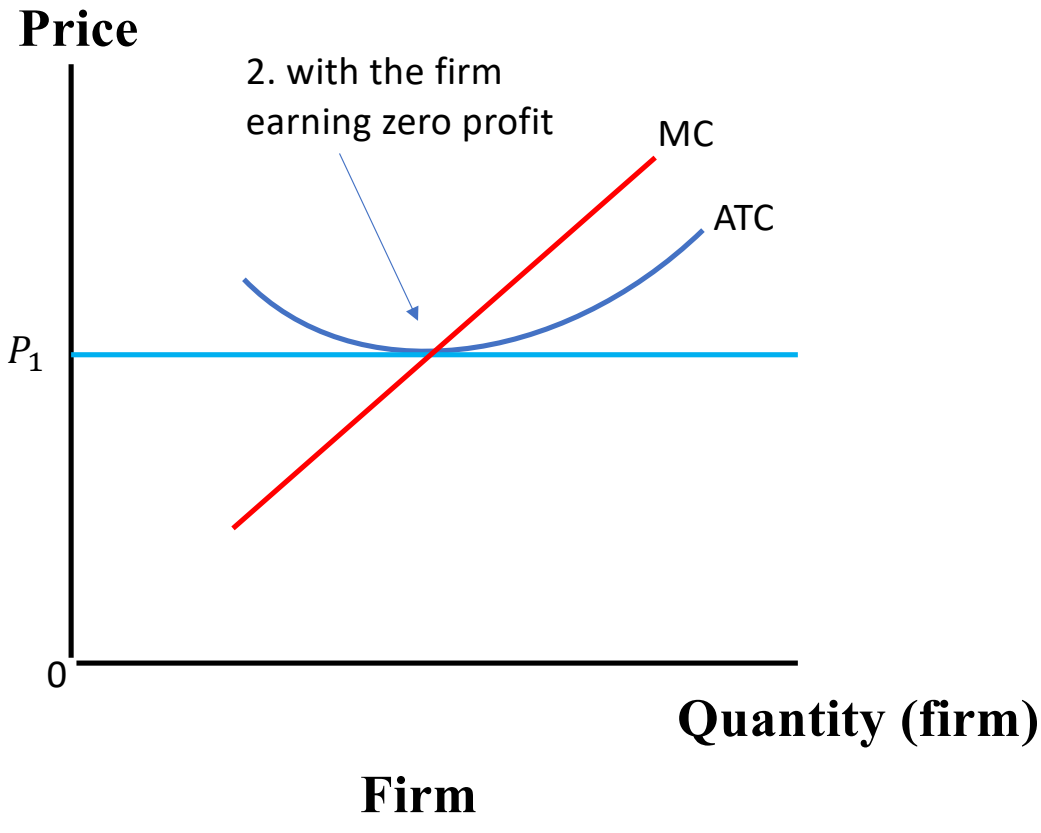
The farmer's accountant, for instance, would conclude that the farm earned a profit of $100,000, which is why the farmer stays in business.

A Shift in Demand in the Short Run and Long Run

- Suppose the market for milk begins in a long-run equilibrium. Firms are earning zero profit, so price equals the minimum of average total cost
- The long-run equilibrium is point A, the quantity sold in the market is Q_1, and the price is P_1.

Initial Condition

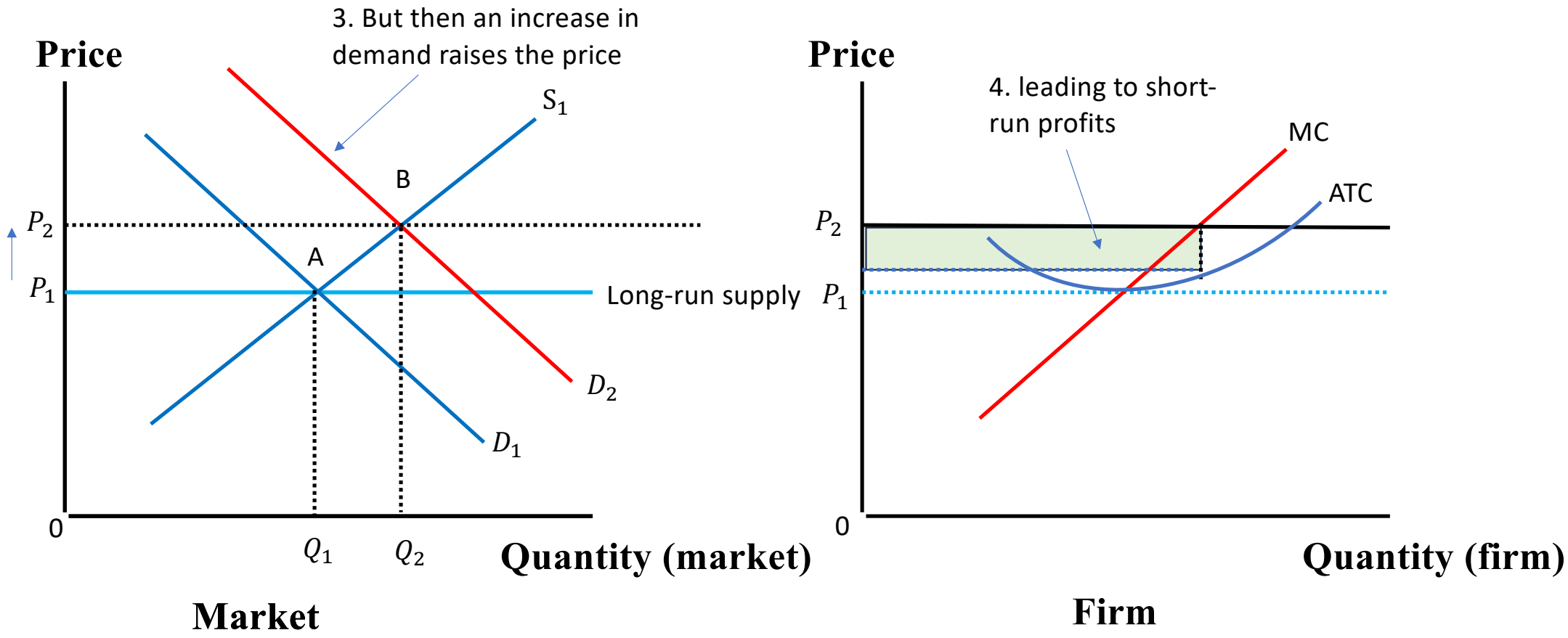




Short-Run Response

- Now suppose scientists discover that milk has miraculous health benefits, causing a surge in demand.
- The demand curve for milk shifts outward from D_1 to D_2.
- The short run equilibrium moves from point A to point B; the quantity rises from Q_1 to Q_2, and the price rises from P_1 to P_2.
- All the firms in the market respond to the higher price by producing more milk.
- Because each firm's supply curve reflects its marginal cost curve, how much each firm increases production depends on the marginal cost curve. In the new short-run equilibrium, the price of milk exceeds average total cost, so the firms are making positive profit.

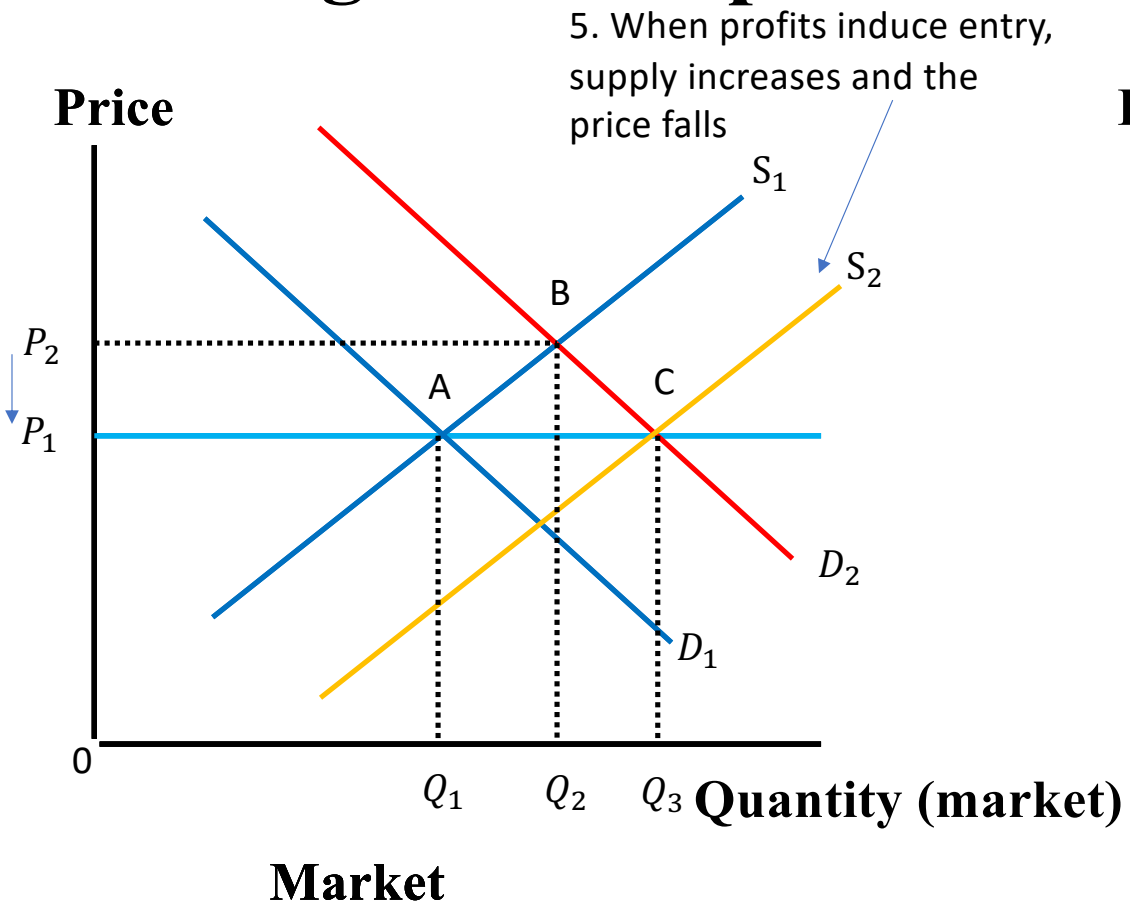
Short-Run Response

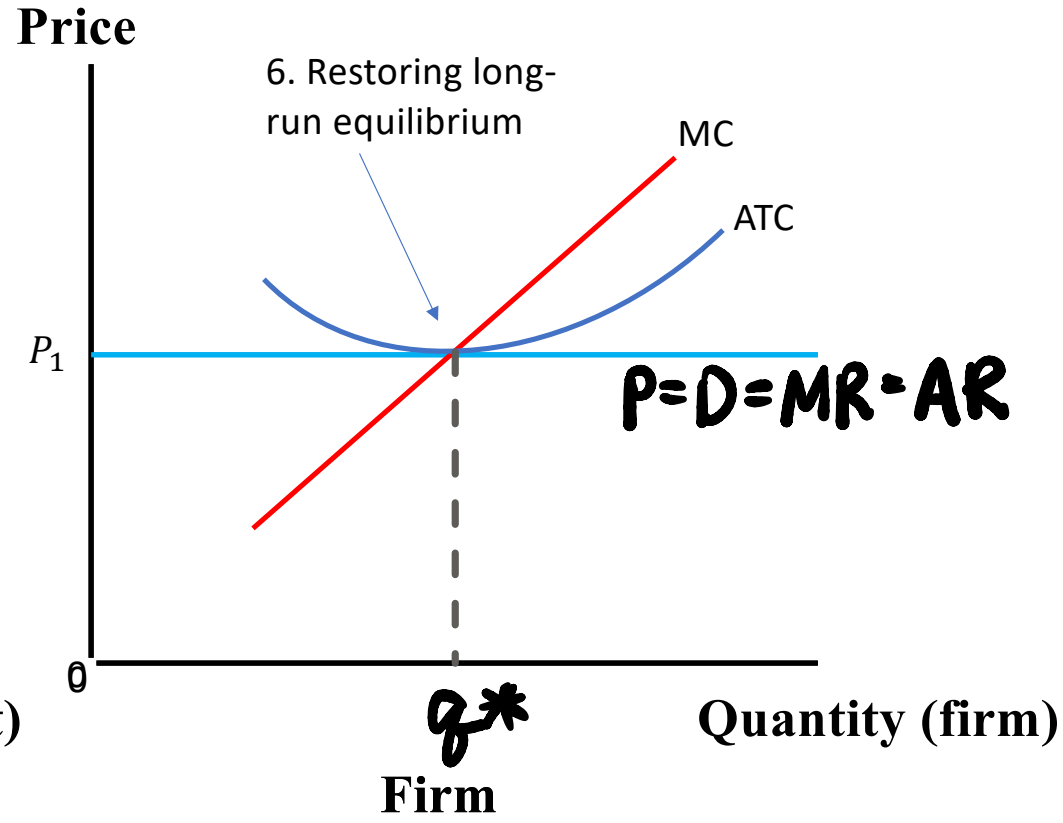


Long-Run Response

- Over time, this profit encourages new firms to enter.
- For example, some farmers supplying other products may switch to producing milk
- As the number of suppliers grows, the quantities supplied at every price increases, the short-run supply curve shifts to the right from S_1 to S_2.
- This shift causes the price to fall.
- Eventually, the price is driven back down to minimum of average total cost, profits are zero, and firms stop entering.
- The market reaches a new long-run equilibrium point C. The price of milk has returned to P_1, but the quantity produced has risen to Q_3.
- Each firm is again producing at its efficient scale, but because more firms are in the dairy business, the quantity of milk produced and sold is higher.

Long-Run Response





CONCLUSION:
The Efficiency of a Competitive Market

- Profit-maximization: $MC = MR$
- Perfect competition: $\boldsymbol{P} = MR$
- So, in the competitive equilibrium $\boldsymbol{P} = MC$

- *MC* is cost of producing the marginal unit.
  P is value to buyers of the marginal unit.

- The competitive equilibrium is efficient, maximizes total surplus

References

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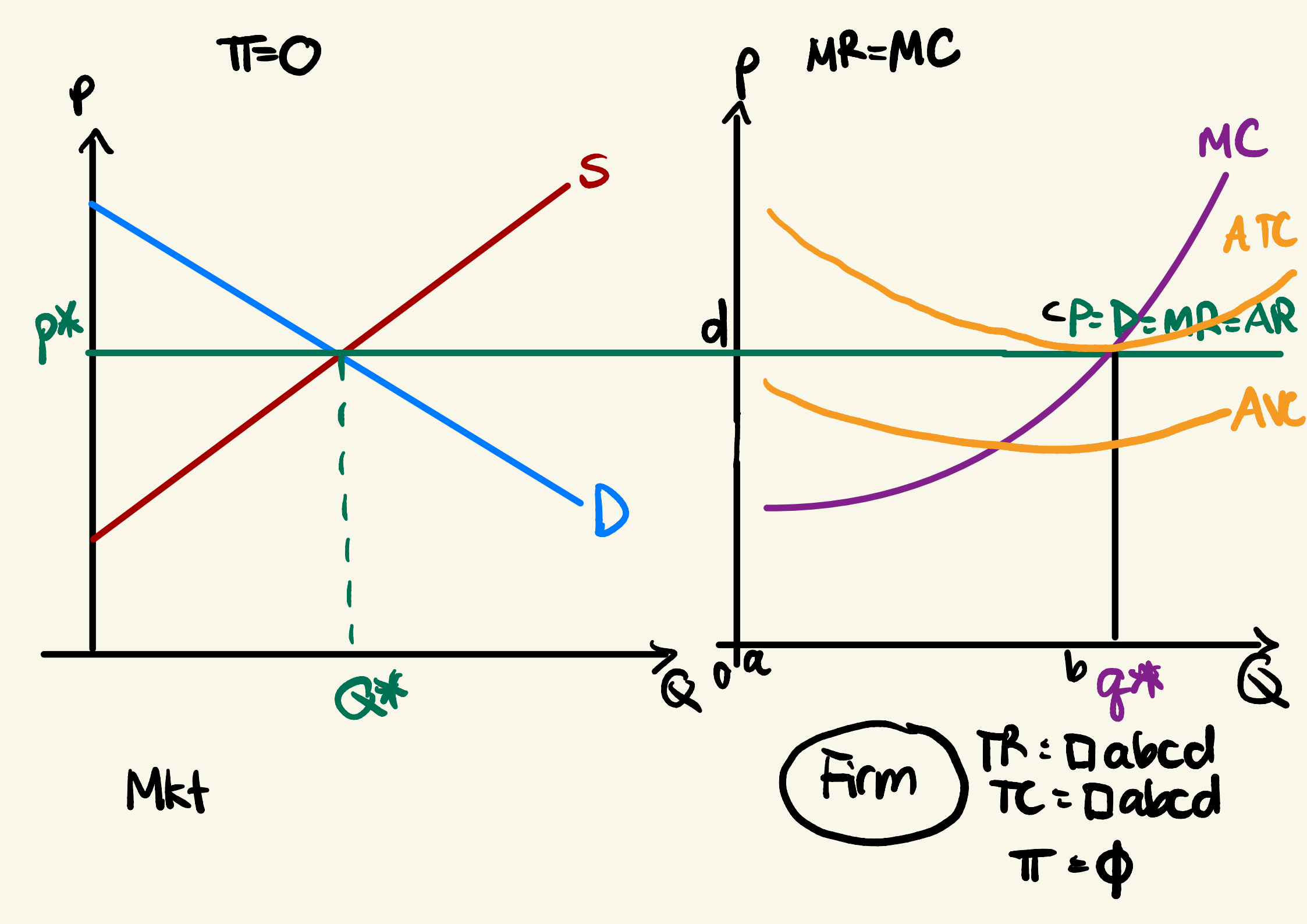
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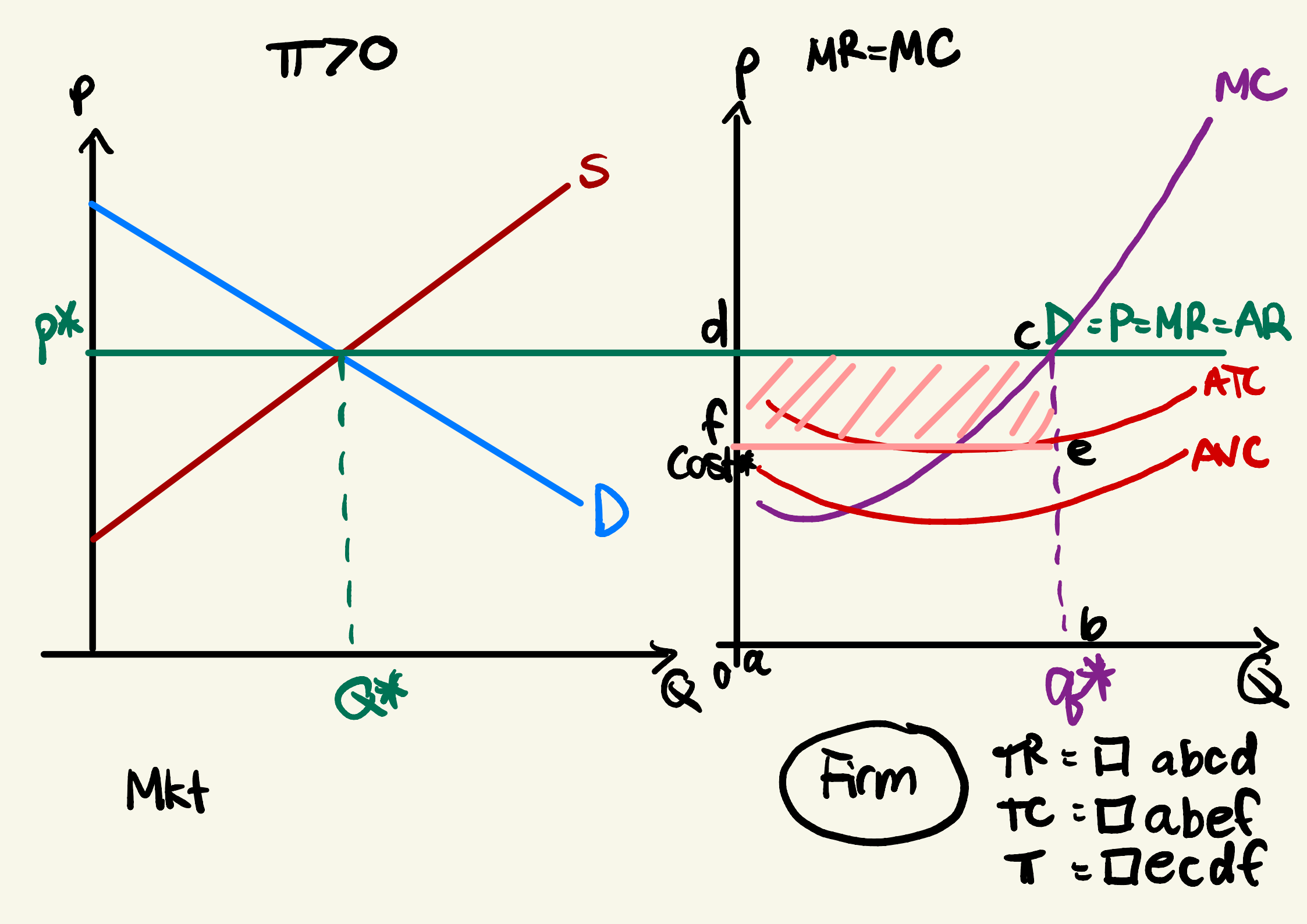
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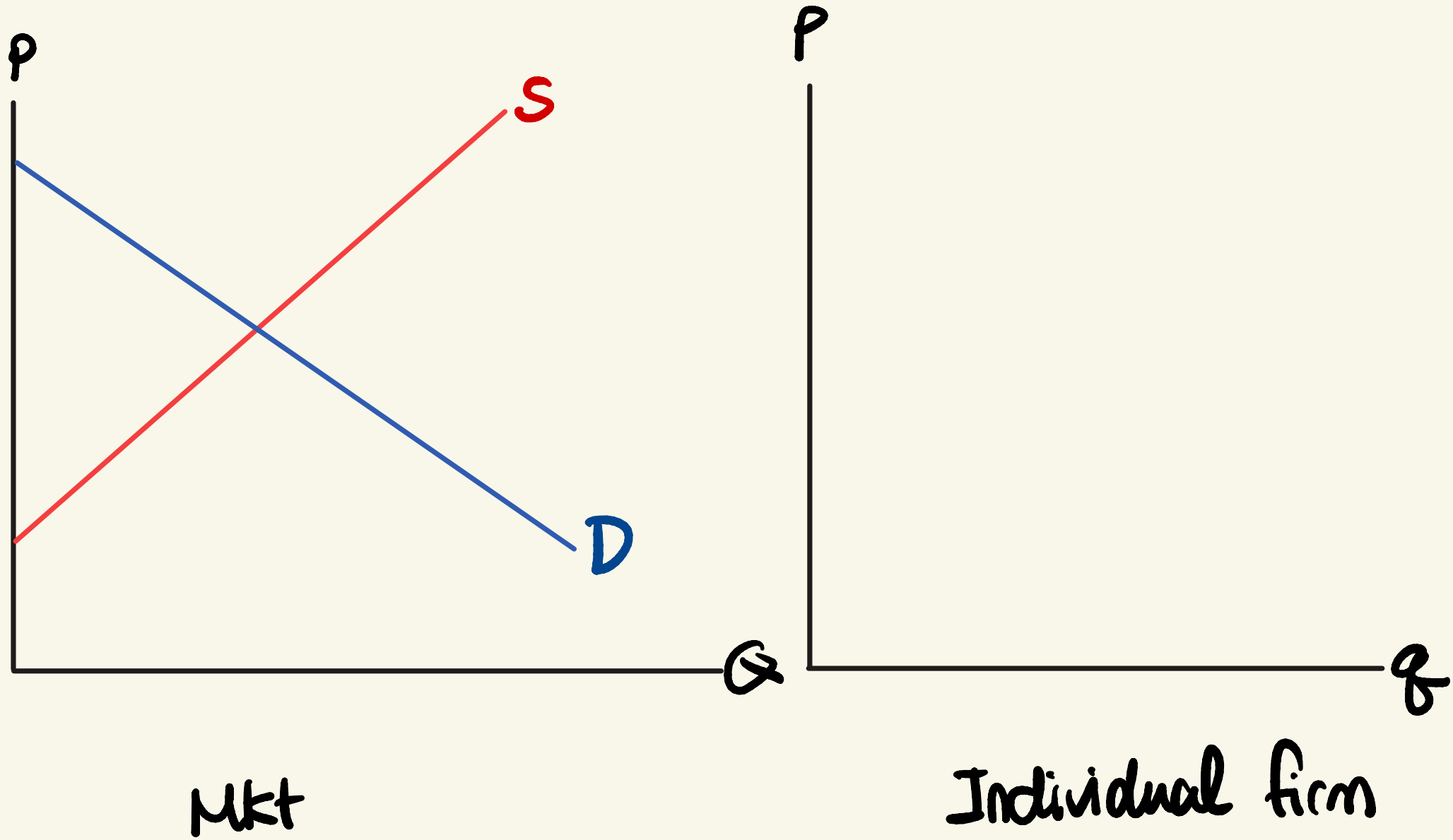
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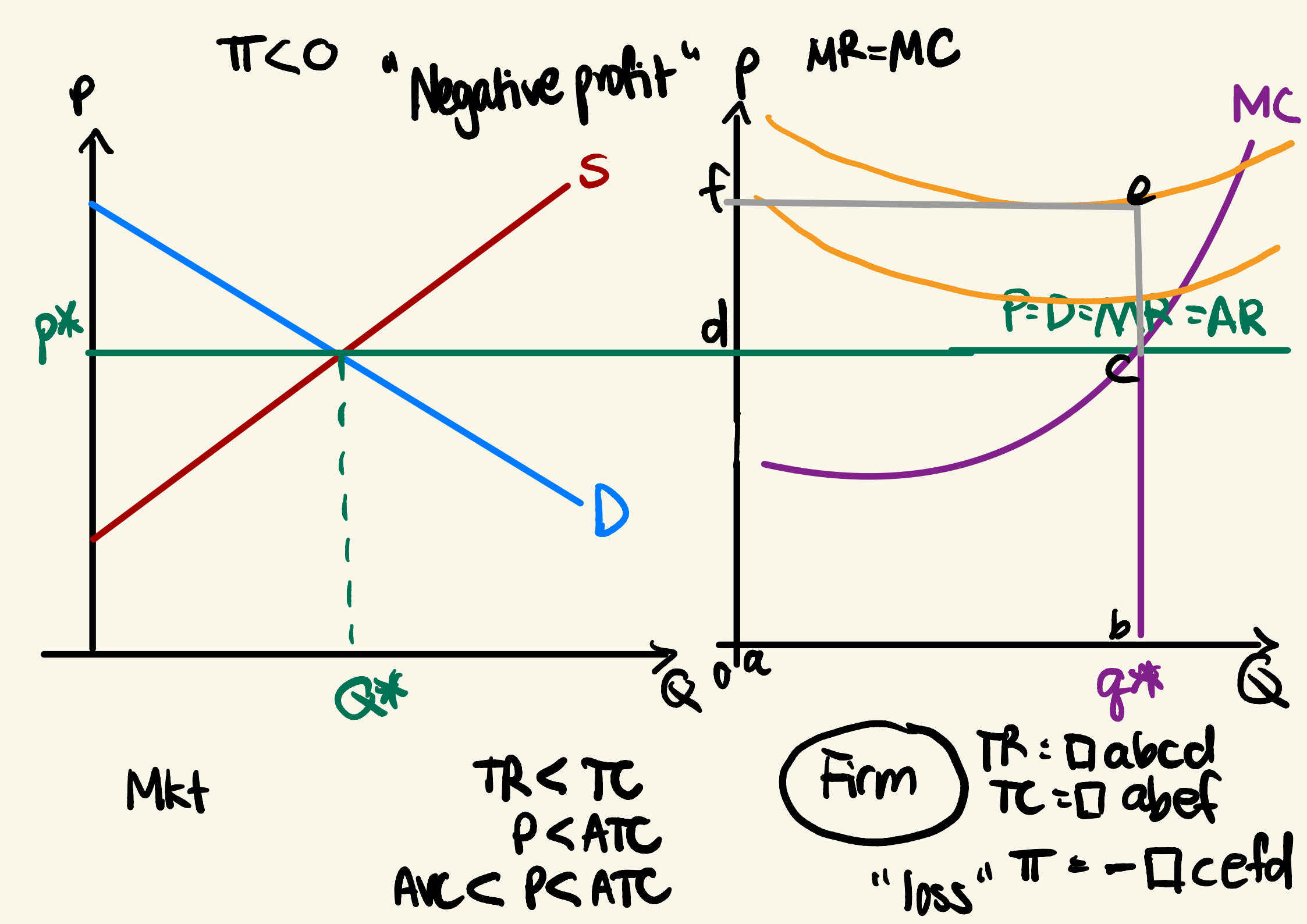
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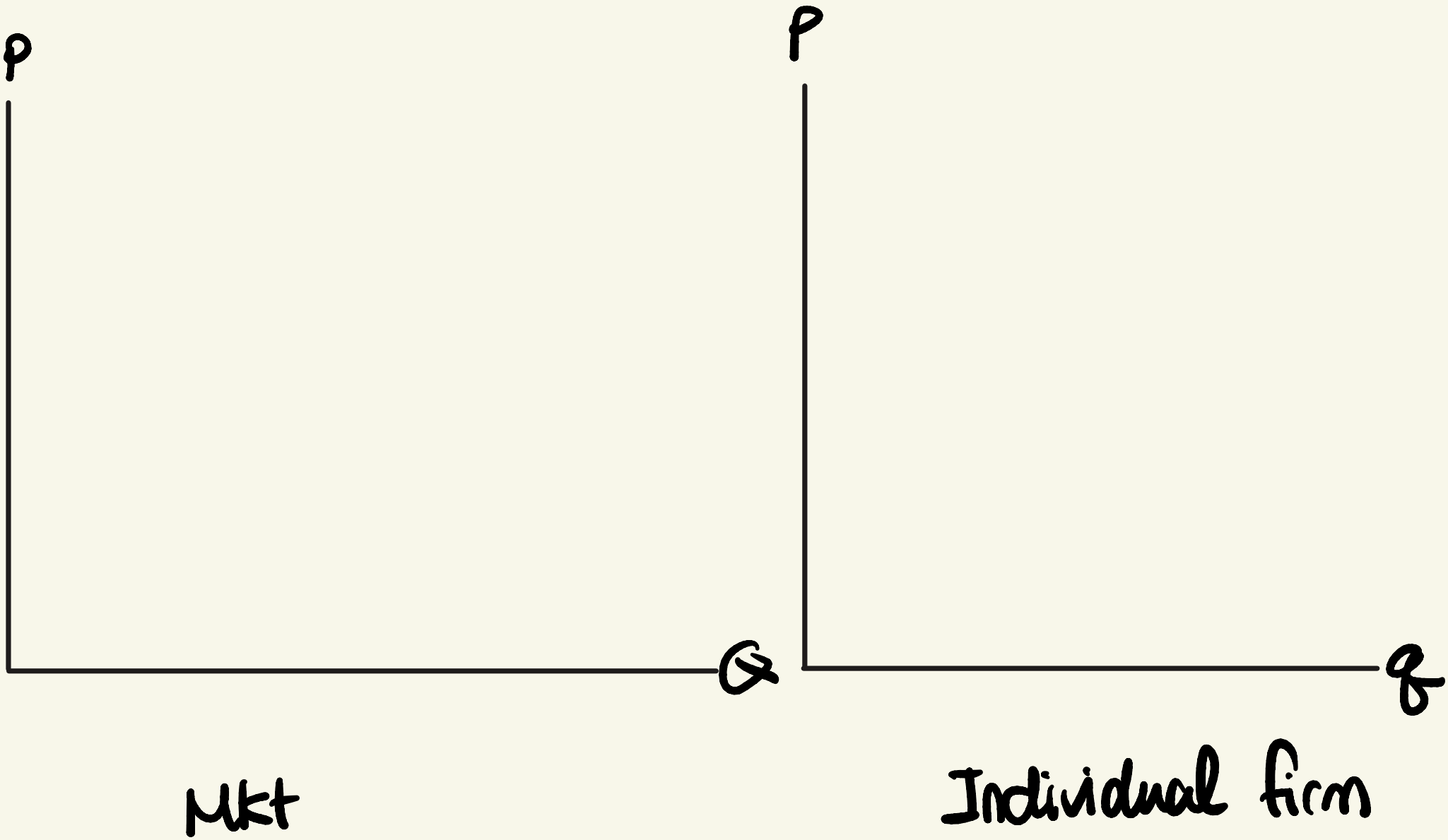
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